
EPA RESEARCH STRENGTHENS GREAT LAKES RESTORATION INITIATIVE

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ISSUE

As the largest group of freshwater lakes on Earth, the Great Lakes (Lakes Erie, Huron, Michigan, Ontario and Superior) are a source of economic prosperity, recreation and raw materials. Human activity, however, has resulted in pollution and other stressors. The Great Lakes currently face significant threats, including invasive aquatic species, contaminated sediments, and pollution from agricultural and urban stormwater runoff.

The Great Lakes Restoration Initiative, established in fiscal year 2010, is an interagency effort led by the U.S. Environmental Protection Agency (EPA) to protect, maintain and restore the Great Lakes. The long-term goals include improving water quality for recreational use and drinking water and providing a healthy ecosystem for fish and wildlife.

SCIENTIFIC OBJECTIVE

EPA conducts research in support of the restoration initiative to better understand the health and productivity of the Great Lakes and to determine when pollution is impacting the coastal ecosystem.

Researchers are:

- Identifying the links between land use, habitat condition and water quality measures
- Providing indicators and methods to monitor complex aquatic ecosystems, and developing models to assess, monitor and restore water quality in the Great Lakes
- Examining the relationships between watersheds and receiving waters (streams, rivers and lakes)
- Investigating changes in watersheds and how they may alter coastal habitats for fish and impact fishing and other benefits of nature (referred to as ecosystem services)
- Analyzing data collected from Great Lakes coastal wetlands to understand the importance of wetlands to water quality and fish communities, and how they are influenced by human activities
- Developing a framework for evaluating the potential effects of chemicals of emerging concern, including chemicals that disrupt hormones in aquatic life, also known as endocrine disruptors
- Providing the tools and technology to remove or remediate contaminated sediments that can impair water quality and impact aquatic life.

APPLICATION AND IMPACT

EPA research has been important to the planning and implementation of restoration efforts. Great Lakes research has been used to inform the development of the Initiative's 2010-2014 Action Plan, which is guiding collaborative restoration.

Research has supported restoration of water bodies with new and improved guidance and methods on how best to monitor and assess the conditions of the lakes. An example is the

National Monitoring Network design for Lake Michigan.

To better target effective restoration, scientists have developed a watershed-based stressor framework to help water quality managers understand land-water sources of stress to coastal ecosystems, including coastal wetlands. The framework is being used as part of the design for the assessment of coastal wetlands.

New approaches to determining restoration progress have been developed and are being used to assess the condition of the Great Lakes by EPA and Environment Canada, as well as provincial and state partners. The design for binational assessments of the Great Lakes now includes probabilistic assessments.

Complex multi-media modeling of contaminants has assisted water quality managers in selecting the most effective options for restoration. For example, model results identified the need to clean up PCBs, a toxic chemical, in three rivers that flow into Lake Michigan, the Fox, Kalamazoo and Grand Calumet Rivers.

Research is also being used to predict the effectiveness of remediation efforts for contaminated sediment sites in several Great Lakes locations. EPA is applying its predictive models, based on field assessments, to the remediation of the Ottawa and Ashtabula Rivers.

Research has enabled water quality managers to detect the presence of invasive species at an early stage, helping to control the spread of the species. For example, at the St. Louis Estuary in Lake Superior several non-native species were identified including the Lumholtz water flea, Henslow's pea clam, and New Zealand Mud Snail.

These species now merit surveillance to determine if they have the potential to cause harmful effects to the ecosystem or to harbor infrastructure.

REFERENCES

Great Lakes Restoration Initiative

<http://greatlakesrestoration.us>

Great Lakes Restoration Initiative Action Plan

http://greatlakesrestoration.us/action/wp-content/uploads/glri_actionplan.pdf

Great Lakes National Program Office

<http://www.epa.gov/glnpo/>

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